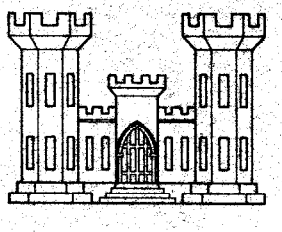
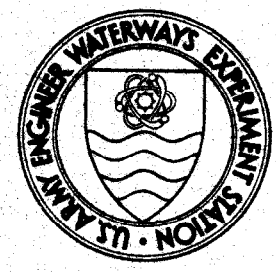


DREDGED MATERIAL RESEARCH PROGRAM



TECHNICAL REPORT D-78-9

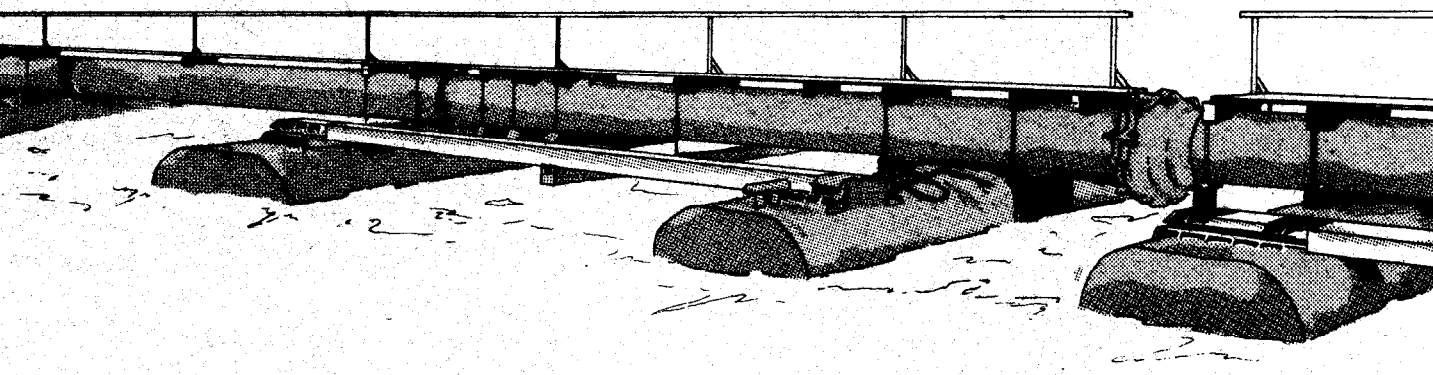
A COMPARISON OF PLANT SUCCESSION AND BIRD UTILIZATION ON DIKED AND UNDIKED DREDGED MATERIAL ISLANDS IN NORTH CAROLINA ESTUARIES

by

James F. Parnell, David M. DuMond, Robert N. Needham

Department of Biology
University of North Carolina at Wilmington
Wilmington, N. C. 28401

May 1978
Final Report



Prepared for Office, Chief of Engineers, U. S. Army
Washington, D. C. 20314

Under Contract No. DACW39-76-C-0134
(DMRP Work Unit No. 4F02)

Monitored by Environmental Laboratory
U. S. Army Engineer Waterways Experiment Station
P. O. Box 631, Vicksburg, Miss. 39180

Destroy this report when no longer needed. Do not return it to the originator.

DEPARTMENT OF THE ARMY
WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS
P. O. BOX 631
VICKSBURG, MISSISSIPPI 39180

IN REPLY REFER TO: WESYV

15 June 1978

SUBJECT: Transmittal of Technical Report D-78-9

TO: All Report Recipients

1. The technical report transmitted herewith represents the results of Work Unit 4F02 regarding a comparison of plant succession and wildlife use of diked and undiked dredged material islands in North Carolina. This work unit was conducted as part of Task 4F (Island Habitat Development) of the Corps of Engineers' Dredged Material Research Program (DMRP). Task 4F was part of the Habitat Development Project of the DMRP and had as its objective the investigation, evaluation, and testing of methodologies for habitat creation and management on dredged material islands.

2. Island habitat development has been studied by the DMRP throughout the United States through the evaluation of vegetation succession and animal use of existing dredged material islands. The most significant wildlife aspect of these islands is their use by colonial nesting sea and wading birds (such as gulls, terns, egrets, herons, ibises, and pelicans). This wildlife resource, although generally inadvertently created, presents a significant opportunity for habitat management and development that is consonant with continued dredged material disposal.

3. In the study reported herein, Work Unit 4F02, the vegetation succession and avian use of North Carolina's 395 diked and undiked dredged material islands were studied. In 1977, 78 percent of all colonial waterbirds in North Carolina nested on dredged material. Few diked islands in this state are older than six years, and long-term effects of diking on colonial bird use are difficult to assess. Generally, nesters preferred undiked islands. Young diked islands provided a greater diversity of habitats and attracted more total bird species (nonnesting). It is anticipated that as diked islands are filled and mature vegetatively, they will provide less attractive nesting habitat than undiked islands.

4. From a local perspective, this study will be of direct value in managing and developing dredged material island habitats in North Carolina. General comparisons of diked and undiked dredged material islands in New Jersey, Florida, and Texas are also provided in this report. A national perspective is presented in a report entitled "Development and Management

of Avian Habitat on Dredged Material Islands" (4F03), which synthesizes island habitat research in North Carolina, the Great Lakes (4F01A), New Jersey (4F01D), Florida (4F01C), Texas (4F01B), the Pacific Northwest (4F01E), and the Upper Mississippi River (4F01F).

JOHN L. CANNON
Colonel, Corps of Engineers
Commander and Director

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: Technical Report D-78-9
2. GOVT ACCESSION NO.:
3. RECIPIENT'S CATALOG NUMBER:

4. TITLE (and Subtitle): A COMPARISON OF PLANT SUCCESSION AND BIRD UTILIZATION ON DIKED AND UNDIKED DREDGED MATERIAL ISLANDS IN NORTH CAROLINA ESTUARIES

5. TYPE OF REPORT & PERIOD COVERED: Final report

6. PERFORMING ORG. REPORT NUMBER: See block 18

7. AUTHOR(s): James F. Parnell, David M. DuMond, Robert N. Needham

8. CONTRACT OR GRANT NUMBER(s): Contract No. DACW39-76-C-0134

9. PERFORMING ORGANIZATION NAME AND ADDRESS: Department of Biology, University of North Carolina at Wilmington, Wilmington, N. C. 28401

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: DMRP Work Unit No. 4F02

11. CONTROLLING OFFICE NAME AND ADDRESS: Office, Chief of Engineers, U. S. Army, Washington, D. C. 20314

12. REPORT DATE: May 1978

13. NUMBER OF PAGES: 286

14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office): U. S. Army Engineer Waterways Experiment Station, Environmental Laboratory, P. O. Box 631, Vicksburg, Miss. 39180

15. SECURITY CLASS. (of this report): Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

This report has also been designated as University of North Carolina at Wilmington Contribution in Marine Sciences Number 797.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Birds	Islands (Landforms)	Waste disposal sites
Dredged material	North Carolina	
Ecological succession	Plants (botany)	
Estuaries	Succession	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This project consisted of a comparison of plant succession and bird utilization on diked and undiked dredged material islands in North Carolina estuaries. After a site is diked, deposition of dredged material may be delayed for several years or it may occur immediately. Unfilled diked islands that were studied had a complex topographic zonation. Plant succession was highly variable on these unfilled sites, with topography, substrate particle size, and availability of water being major causative factors. Plant succession on diked

(Continued)

20. ABSTRACT (Continued).

and filled sites was similar to that on undiked islands except that dikes tended to vegetate more quickly than did the deposits on outer portions of undiked sites.

Only the least and gull-billed terns were found nesting predominantly on diked sites, with most nesting gulls and terns locating the majority of their breeding colonies on undiked sites. Fifteen to 30 years will be required for thickets suitable for wading bird colonies to develop on diked islands in North Carolina. Based on observations in New Jersey, it is expected that wading birds will use diked sites when appropriate habitat becomes available. No positive values of dikes relative to nesting colonial birds were discovered.

One hundred forty-two species of shorebirds, waterfowl, and land birds were recorded on diked islands, while 94 species were found on undiked sites. Heaviest use was during fall migration. The increased avian diversity of diked over undiked sites paralleled the increased temporary diversity of habitats on diked sites.

Habitat diversity is expected to decrease on mature diked islands as such sites continue to receive dredged material. Such mature islands will likely not be as suitable for nesting colonial birds as either undiked or young diked islands. It is recommended that diking not be used on islands heavily used by nesting waterbirds or wading birds.

Appendices A-D present soils, vegetation, bird, and cartographic data, respectively.